

LIZARDS OF THE GENUS *AMEIVA* IN BARTICA DISTRICT

NOTES ON THEIR COLOR AND PATTERN VARIATION

Preparatory to intensive studies of the ontogenetic and phylogenetic evolution of color and pattern among neotropical birds, many notes have been made of the remarkable variations found among lizards, especially in such abundant forms as *Ameiva*. While reserving the publication of these until another season's work will have made them more complete, I make mention here of the bearing which color and pattern variation have on the present classification of certain *Ameiva*.

"A Revision of the Lizards of the Genus *Ameiva*" is the title of a very excellent and thorough paper by Thomas Barbour and G. Kingsley Noble.* I wish especially to speak of the forms which the authors recognize as *Ameiva ameiva ameiva*, *A. a. bilineata*, *A. a. melanocephala*, and *A. a. petersii*.

The following quotations have to do with these subspecies:

KEY TO THE SPECIES

- i¹ Dorsal surface with heavy confluent spots of black. j¹ Throat sprinkled with a few black spots.....*ameiva ameiva*
j² Throat smoky. k¹ Brachials in three rows of subequal scales.....*atrigularis*
k² Brachials in one row of very large scales and three rows of smaller ones
ameiva melanocephala
i² Dorsal surface with a few black spots not confluent. j¹ A broad lateral band of brown on each side of the adult.....*ameiva bilineata*
j² Lateral stripe indistinct or wanting.....*ameiva petersii*

HABITAT

Ameiva a. ameiva. Widely distributed over the northeastern part of South America from the Demerara River in British Guiana as far south as Bahia, Brazil, inland along the Amazon to as far west as the Madeira River.

Ameiva a. bilineata. Apparently confined to the region between the Demerara and Orinoco Rivers.

Ameiva a. melanocephala. Probably widely distributed throughout Venezuela.

Ameiva a. petersii. Found along the upper Amazon from the Madeira River westward.

*Bull. Mus. Comp. Zool. Harv. LIX. No. 6, 1915, pp. 417-479.

As regards the two subspecies inhabiting British Guiana, the conclusions are based on six specimens, one from Tumatumari and five from Dunoon. The detailed descriptions are from individuals measuring from one hundred and six to one hundred and sixty-two millimeters in length—individuals which I should hardly be inclined to call fully adult. The average of a half hundred specimens collected in one locality I have found to be almost twice this length, while extreme individuals reach over five hundred millimeters.

By a minor geographic error the ranges of the two British Guiana forms are made to overlap, as Tumatumari, the locality for *Ameiva*, is a cataract on the Potaro, a western tributary of the Essequibo, far west of the Demerara and hence well within the indicated range of *bilineata*, "between the Demerara and Orinoco Rivers." Dunoon is on the Demerara River.

The main point I wish to make is that within an area of about five hundred yards around the Research Station of Kalacoon, and within a period of one week, I have collected several score of perfectly typical specimens of *ameiva*, *bilineatus*, *melanocephala* and *petersii*; and others which, judged by still more extreme variation of color and pattern, deserve still further subspecific differentiation. A certain proportion of this remarkable variation is due to age—to ontogenetic pigmental and pattern changes, but, on the other hand, all the forms are represented in my collection by fully adult lizards, that is, by individuals three hundred millimeters or more in length. This extremely local variation would seem to indicate either that all four forms were only intermediate variations, or, rather improbably, that Bartica District is a meeting place for a quartet or more of geographic subspecies. This collection of several score specimens from one locality opens up most interesting questions, and the correlation of observations carried on more widely, should quickly solve these rather superficial problems of diagnostic characters of color and pattern.

The ontogenetic phase can be certainly demonstrated. Young specimens of Bartica *ameiva* averaging one hundred and fifty millimeters in length are almost invariably of an extreme *bilineatus* type, exceeding the description of that form as given by Barbour, in concentration of pigment as much as it in turn is said to differ from *ameiva*. The dorsal and ventral surfaces are immaculate, while a broad black band begins at the snout and extends back to the thigh,

narrowly bordered above and below with blue or white. In about ten per cent. of these small specimens the black body bands are broken up by vertical rows of faint dots.

A second, larger stage, averaging about two hundred and fifty millimetres in length shows black spotting on the throat, and a more decided penetration of the black body bands by the rows of dots. But a new pattern in this phase is a double dorsal series of large black spots, which is found neither in larger nor in smaller forms of this lizard. In my notes I have distinguished this as *bipunctata*.

Passing through larger stages we find a typical lizard of four hundred millimetres in length with much of the upper surface covered with large confluent blotches, and the black lateral bands practically gone, the bluish-white vertical rows of dots of great size, and furnishing the dominant color and pattern note. It has changed from a brown, banded lizard to a green, spotted one. It is nearer to the description of typical *ameiva* than anything else, but lacking such relatively immature characters as the white flank stripe, and the lateral, black, caudal stripe.

Finally, we find a few big bluish-green giants over five hundred millimetres in length, dotted rather than blotched above, and with the lateral green spots large, isolated and framed in black—this framing being all that is left of the broad solid bands which form such a dominant feature in many smaller specimens.

While much more material is needed and will be secured in the near future, yet even in this collection, a hint of still another problem is presented. In all the sizes and color patterns we find occasional individuals which appear melanistic—either in part or as a whole. Thus a specimen which will pass as extreme *melanocephala*, has the entire sides of the head, lower jaw, chin, throat and lower neck to between the forelegs, jet black. This anterior concentration of pigment seems to have been directly at the expense of the dark pigment in other parts of the body. The dorsal and lateral regions are quite green, with the isolated pale lateral dots lacking even their black frame, so drained are all the posterior parts of the animal of their black pigment. It has had a rush of melanism to the head, giving the superficial appearance of a very remarkable pigmented mutation.

A second and more abundant melanistic form goes farther, and while above presenting a dull *ameiva* or *petersii* color and pattern, is

quite uniformly smoky black below. For purposes of record I have called this *melanoventer*.

Studies of the color and pattern variations in living and recently killed specimens; recording of sexual characters in hundreds of individuals, especially of mating pairs; scrutiny of the variations within a single brood of these lizards; uninterrupted observation of ontogenetic changes in individuals from the egg to the five hundred millimetre stage; all these will surely contribute to the solution of such intensely interesting problems as the following:

(a) Are *ameiva*, *bilineata*, *petersii*, *bipunctata*, *melanocephala* and *melanoventer* recognizable geographic subspecies or variations, which meet and live close together within a few yards radius.

(b) Are they ontogenetic phases of one or more species?

(c) Is it possible that in different localities they combine in part both *a* and *b*; a paedogenetic acceleration or retardation such as we find in Axolotl?

(d) Are these characters environmental or hereditary?

(e) Are the similar variations which Gadow* has so well demonstrated in Mexican *Cnemidophorus* to be considered as parallel or convergent when compared with those of *Ameiva*, in addition perhaps to being a striking instance of orthogenesis?

*A Contribution to the Study of Evolution Based Upon the Mexican Species of *Cnemidophorus*, Proc. Zool. Soc., London, 1906, I, p. 277.